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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,469	03/24/2005	Frank Peng	611-90	9269
23117	7590	08/15/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			KINNEY, ANNA L	
			ART UNIT	PAPER NUMBER

1731

DATE MAILED: 08/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/526,469

Applicant(s)

PENG ET AL.

Examiner

Anna Kinney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2005.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-21 is/are rejected.  
7) ☒ Claim(s) 10 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/4/05.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

Claim 10 is objected to because of the following informalities: the word "least" is misspelled in line 2 of the claim. Appropriate correction is required.

### ***Specification***

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it contains the legal phraseology "said". Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities: on the last 2 lines of page 5, "secondary" is misspelled. The Examiner suggests the applicant review the specification for similar informalities.

Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 6, 10-14, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheiri et al (EP 0 430 915 A1) in view of Bystedt (WO 89/02951), both references supplied by applicant.

With respect to claim 1, Vaheiri discloses a method of producing mechanical pulp (pg. 2, line 2), comprising impregnation (i.e., enzyme treatment) of fiber material with an enzyme-containing aqueous liquid (pg. 2, lines 41-42) prior to defibration and refining of the fiber material to produce a mechanical pulp (pg. 2, lines 10-12 and 25-26), characterised in said enzyme-containing aqueous liquid being a pectinase-containing (pg. 2, lines 27-28) aqueous liquid, and discloses compression (pg. 2, lines 5-6). However, Vaheiri does not disclose compression associated with impregnation.

Bystedt discloses a method of producing mechanical pulp characterized in initial compression of the fiber material, impregnation with an aqueous liquid (pg. 8, lines 20-25), defibration (Abstract), and refining (pg. 3, lines 30-38).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to compress fiber material as described by Bystedt in the impregnation method of Vaheri to obtain the invention as specified in claim 1.

The motivation would have been that it is usual to impregnate wood in chip form by compressing it and cause it to expand in the liquid (pg. 3, lines 6-7) to fill the pores of the wood with impregnation liquid as completely as possible (pg. 2, lines 27-28).

With respect to claim 2, Bystedt discloses that the initial compression of the fiber material is a mechanical compression (pg. 3, lines 7-10), combined with a thermal pretreatment of the fiber material by steaming, before the impregnation (pg. 7, lines 8-15). The Examiner notes that the claimed thermal pretreatment step is optional.

With respect to claim 4, Bystedt discloses that compression is performed by a twin roll press (Fig. 3, items 3), with a pressure of from 0 MPa (pg. 6, lines 1-14) to 30 MPa (pg. 6, line 28 – pg. 7, line 2), which the Examiner construes to provide compression ratios within the claimed range of 1:1 to 8:1.

With respect to claim 6, Vaheri discloses that the aqueous liquid comprises two or more enzymatic preparations wherein at least one of the preparations has pectinase activity (pg. 2, lines 27-28).

With respect to claim 10, Bystedt discloses that the aqueous liquid comprises at least one sulfite (pg. 8, lines 20-24) at a concentration of 90 g/L with 5% taken up in bone-dry wood (pg. 11, lines 2-13), which the Examiner construes to provide a charge of 1 to 10 kg/ton and/or sulfite at a charge of 5 to 50 kg/ton.

With respect to claim 11, Vaheri discloses a retention time after uptake of the impregnation liquid of 3 hours, which is 1 specific point within the claimed range of 3 min to 24 hours (pg. 2, lines 43-44).

With respect to claim 12, Vaheri discloses a temperature in the retention after uptake of the impregnation liquid of 10-90°C, preferably 40-70° (pg. 2, lines 29-30), which contains 3 specific points within the claimed range of 20 to 100°C, and 2 specific points within the optional range of 35 to 70°C, and 1 specific point (40) that is about the optional about 50°C.

With respect to claim 13, Vaheri discloses a pH in the impregnation liquid of 2.0-10.0, preferably 4.0-8.0 (pg. 2, lines 29-30), which contains 3 specific points within the claimed range of 3 to 10, 1 specific point within the optional range of 4 to 7, and 1 specific point (4.0) that is about the optional pH of about 5.

With respect to claim 14, Vaheri discloses that the defibration and refining of the fiber material is performed by use of a Sprout Waldron d 30 cm refiner (pg. 2, line 48, which the Examiner construes to be a single disc, double disc or conical refiner, in multi stages (i.e., refining was performed twice; pg. 2, lines 48-49).

Bystedt also discloses defibration and refining of the fiber material is performed by use of a double disc refiner (pg. 3, lines 29-31).

With respect to claim 18, Vaheri discloses that the fiber material is wood chips (pg. 2, lines 22-23), which are either softwood chips or hardwood chips.

With respect to claim 19, Bystedt discloses that the fiber material is non-wood fiber material including bamboo (pg. 1, lines 5-8).

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Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheri and Bystedt as applied to claims 1 and 2 above, and further in view of Falk et al (WO 92/20855; provided by applicant).

With respect to claim 3, Vaheri and Bystedt do not disclose expressly the time of the steam preheating step.

Falk discloses a method of producing mechanical pulp (pg. 1, lines 7-13) in which steaming is carried out for a period of from 1 to 3 minutes (pg. 4, lines 27-33), which contains 2 specific points within the claimed range of 1 to 30 min.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a steaming time as described by Falk in the mechanical pulping method of Vaheri and Bystedt to obtain the invention as specified in claim 3.

The motivation would have been reducing the amount of energy consumed by the refinement process (pg. 8, lines 1-8).

With respect to claim 20, Vaheri and Bystedt do not disclose expressly that the pulp is bleached after refining.

Falk discloses that the pulp obtained after defibration and refining is bleached with alkaline peroxide (pg. 2, lines 20-24), to obtain bleached pulp having high brightness (pg. 5, lines 9-13).

Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheri and Bystedt as applied to claim 1 above, and further in view of Akkawi (U.S. 4,891,096).

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With respect to claim 5, Vaheri and Bystedt do not disclose expressly what type of pectins the pectinase has activity for.

Akkawi discloses a method of biochemical degradation of cements to permit physical separation of cellulose fibers (col. 2, lines 28-37, and col. 1, lines 11-17) used for paper manufacture (col. 2, lines 7-11) using a pectinase-containing liquid (Abstract, lines 4-8) that comprises an enzymatic preparation with pectolytic activity for both pectins and esterified pectins (col. 3, lines 29-38).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to expect pectolytic activity as described by Akkawi in the mechanical pulp production method of Vaheri and Bystedt to obtain the invention as specified in claim 5.

The motivation would have been that pectinase has a double activity on pectic substances (col. 3, line 29).

With respect to claim 9, Akkawi discloses a pectinase charge of between 0.01 and 2%, and preferably between 0.05% and 1%, which the Examiner construes to contain at least one point within the claimed range of 2,000,000 to 200,000,000 polygalacturonase units/ton fiber material.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheri and Bystedt as applied to claim 1 above, and further in view of Eriksson et al (U.S. 3,962,033) and Call (U.S. 5,203,964).

With respect to claim 7, Vaheri and Bystedt do not disclose expressly the direct addition of a fungal or bacterial microorganism.



Eriksson et al discloses a method of producing pulp, comprising treating the starting material with a biological agent comprising an organism capable of forming lignin-decomposing enzymes (Abstract) prior to defibration to produce a mechanical pulp (col. 5, lines 62-65). Eriksson does not disclose expressly that the biological agent has pectolytic activity.

Call discloses a method of producing cellulose from lignin-containing raw materials (title), and indicates the interchangeability of microorganisms and enzymes produced from the microorganisms as a biological agent (col. 3, lines 51-53) as well as that pectinase is a lignin degradation reaction agent (col. 5, lines 20-23).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use pectinase for lignin degradation as described by Call to treat a starting material prior to defibration as described by Eriksson in the mechanical pulp production method of Vaheri and Bystedt to obtain the invention as specified in claim 7.

The motivation would have been that lignin is substantially decomposed without the cellulose being appreciably affected in the process thereof (Eriksson, col. 1, lines 53-58) and the removal and/or transformation of lignin present in material containing lignocellulose (Call col. 1, lines 56-61).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheri and Bystedt as applied to claim 1 above, and further in view of Christgau et al (U.S. 5,830,734).

With respect to claim 8, Vaheri and Bystedt do not disclose expressly the source of the pectinase.

Christgau discloses that polygalacturonase and pectin lyase (i.e., pectinase) arise from a group of microorganisms containing *Aspergillus aculeatus* and *Aspergillus oryzae* (col. 7, lines 41-54).

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to derive pectinase from an aspergillus organism as described by Christgau in the mechanical pulp production method of Vaheri and Bystedt to obtain the invention as specified in claim 8.

The motivation would have been to hydrolyse various plant cell wall-derived materials (col. 8, lines 66-67).

Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaheri and Bystedt as applied to claims 1 and 14 above, and further in view of Casey (James P. Casey, Ed., Pulp and Paper Chemistry and Chemical Technology, 3<sup>rd</sup> Ed., Vol. 1, 1980, John Wiley & Sons, pp. 217, 224, and 226).

With respect to claim 15, Vaheri and Bystedt do not disclose expressly a refiner rotation speed.

Casey discloses conventional refiners, and discloses single-rotating disk refiners having a speed of rotation of 1,500 or 1,800 rpm (pg. 224, last ¶, lines 12-14), and double-disk refiners with rotation speeds of 2400 or 3000 rpm (pg. 224, last ¶, lines 5-8) which contains 4 specific points within the claimed range of 1000 to 3000 rpm, and 3 specific points within the optional range of 1500 to 2600 rpm.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a refiner speed of rotation as described by Casey in the mechanical pulping process of Vaheri and Bystedt to obtain the invention as specified in claim 15.

The motivation would have been that there are three types of refiner: double disk, single disk, and twin disk (pg. 224, last ¶, lines 1-4), and that higher disk speed develops a better quality pulp with low-debris content (pg. 226, line 1).

With respect to claims 16 and 17, Bystedt discloses heating chips prior to refining at overpressure (pg. 3, lines 31-36), and discloses softening the fiber material in boiling water (i.e., preheating before refining) for from 0 to 20 minutes (pg. 9, line 11).

Casey discloses a refiner rotation speed of 1,500 or 1,800 rpm, which contains 2 specific points within the optional range of 1200 to 1800 rpm for claim 16, and 2,400 or 3,000 rpm, which contains 2 specific points within the optional range of above 2,000 rpm for claim 17, as discussed above. Casey further discloses self-pressurization of refiner plates due to steam production from high-energy refining, including specific pressures from 100 kPa to 400 kPa (1 to 4 bars; pg. 217, Fig. 4-27, (d), which contains 2 specific points within the claimed range of from atmospheric up to 5 bar for claim 16, and 1 specific endpoint within the claimed range of from 4 to 8 bar for claim 17.

Claim 21 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Vaheri et al.

With respect to claim 21, this claim is a product by process. See MPEP § 2113. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself (i.e., differences in product

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characteristics), and not on its method of production. In the present instance, all that is claimed is Mechanical pulp, which is shown by Vaheri. Therefore, the Examiner can discern no significant differences between the claimed product and the product of Vaheri. In the event any differences can be shown for the product of the product-by-process claim 21, as opposed to the product taught by the reference Vaheri, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results; see also *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 20040069426 A1 shows a method for enzymatic treatment of mechanical cellulose pulps, including using microorganisms that produce pectinase, and including *A. oryzae*. US 20040231811 A1 shows compressing chips prior to impregnation, mechanically defibrating, refining, and bleaching lignocellulosic materials with hydrogen peroxide, with refiner speeds. US 20040238134 A1 shows biopulping logs using pectinase pretreatment. US 20050000666 A1 shows an enzyme treatment comprising pectinase in a mechanical pulping process, and shows enzyme production from *Aspergillus aculeatus*. US 20050011622 A1 shows chip compression before defibrating and refining, with refiner speeds, and peroxide addition. US 5374555 A shows biopulping with pectinase pretreatment. US 6001639 A shows the use of endoglucanases derived from *Aspergillus aculeatus* in treating cellulosic material prior to refining.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anna Kinney whose telephone number is (571) 272-8388. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ALK

  
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